



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/776,080	02/01/2001	Wei-Lien Hsu	5500-60900	9437

7590

06/03/2004

B. Noel Kivlin
Conley, Rose & Tayon, P.C.
P.O. Box 398
Austin, TX 78767-0398

EXAMINER

DO, CHAT C

ART UNIT

PAPER NUMBER

2124

DATE MAILED: 06/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/776,080

Applicant(s)

HSU ET AL.

Examiner

Chat C. Do

Art Unit

2124

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-12 and 14-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-12 and 14-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This communication is responsive to Amendment B, filed 03/12/2004.
 2. Claims 1-3, 5-12, 14-20 are pending in this application. Claims 1, 11, and 16-20 are independent claims. In Amendment B, claims 4 and 13 are cancelled and claim 20 is added.
- This action is made non-final.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 5, and 16-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Horton (U.S. 6,421,696).

Re claim 1, Horton discloses in Figure 3 and 8 a method of performing a two dimensional discrete cosine transform "DCT" using a microprocessor having an instruction set that includes SIMD floating point instructions (abstract and col. 3 lines 24-30), wherein the method comprises: receiving a block of integer data having C columns and R rows (col. 1 lines 57-58 and col. 1 lines 36-42 wherein the frame is a two dimensional data), wherein each of the R rows contains C row data values, wherein the block of integer data is indicative of a portion of an image (col. 1 lines 36-42); and for

each row, loading the C row data values of the row into registers (Figure 6 and col. 2 lines 44-50); converting the C row data values into floating point form (col. 4 lines 60-65), wherein the registers each hold two floating point row data values ($\{Re(0): Re(1)\}$, $\{Re(2): Re(3)\}$,... in Figure 6); and performing a plurality of weighted-rotation operations on the values in the registers (Figure 10), wherein the weighted-rotation operations are performed using SIMD floating point instructions (col. 5 lines 1-6 and lines 28-34); altering the arrangement of values in the registers; performing a second plurality of weighted-rotation operations on the values in the registers; again altering the arrangement of the values in the registers; performing a third plurality of weighted-rotation operations on the values in the registers; yet again altering the arrangement of the values in the registers; and performing a fourth plurality of weighted-rotation operations on the values in the registers to obtain intermediate floating point values (depending on the number of input data, more stages are repeated as seen in Figure 10 and Figure 1).

Re claim 5, Horton further discloses in Figure 3 and 8 for each row, storing the intermediate floating point values to an intermediate buffer (Figure 6 and col. 6 lines 33-35).

Re claim 16, it is a computer system claim of claim 1. Thus, claim 16 is also rejected under the same rationale in the rejection of rejected claim 1.

Re claim 17, it is a carrier medium comprising software instruction claim of claim 1. Thus, claim 17 is also rejected under the same rationale in the rejection of rejected claim 1.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being obvious over Horton (U.S. 6,421,696) in view of Advanced Micro Devices Inc. ("AMD Extensions to the 3Dnow!™ and MMX™ Instructions Sets Manual").

Re claim 2, Horton discloses in Figure 10 a DCT operation in floating point format. Horton does not disclose a converting is accomplished using the pi2fw instruction. However, Advanced Micro Devices Inc. discloses in page 2 Table 1 the functionality of pi2fw instruction in multimedia operations. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add the pi2fw instruction in the Advanced Micro Devices Inc.'s manual into Horton's invention for converting packed integer to floating point words because it would enable to simplify the system software and improve the system performance.

Re claim 3, Horton discloses in Figure 10 weighted-rotation operations are accomplished using the swap operation, multiply operation (with weight), and accumulate operation in floating point format. Horton does not disclose weighted-rotation operations are accomplished using the pswap, pfmul, and pfpnacc instructions. However, Advanced Micro Devices Inc. discloses in page 2 Table 1 the the pswap, pfmul, and pfpnacc instructions for used in the swap operation, multiply operation (with

Art Unit: 2124

weight), and accumulate operation in floating point format. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add the pswap, pfmul, pfpnacc instructions as seen in the Advanced Micro Devices Inc's manual into Horton's invention for performing the DCT operations because it would enable to simplify the system software and improve the system performance.

7. Claims 6-12, 14-15, and 18-20 are rejected under 35 U.S.C. 103(a) as being obvious over Horton (U.S. 6,421,696) in view of Hung et al. ("Statistical Inverse Discrete Cosine Transforms for Image Compression").

Re claim 6, Horton does not disclose a second dimensional DCT comprising for two columns at a time, loading data from two columns of intermediate data into each of a plurality of registers; performing a plurality of weighted-rotation operations for two columns are performed in parallel using SIMD floating point instructions. However, Hung et al. disclose in Figure 2 a second dimensional DCT (column operations) comprising for two columns at a time (e.g. even and odd), loading data from two columns of intermediate data into each of a plurality of registers; performing a plurality of weighted-rotation operations for two columns are performed in parallel using SIMD floating point instructions (Figure 4 discloses multiple columns of data are processed instantaneously). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add a second dimensional DCT comprising loading two columns at a time and performing a plurality of weighted-rotation operations for those two columns as seen in Hung et al.'s invention into Horton's invention because

Art Unit: 2124

it would enable to increase the system performance in the second dimension DCT by processing multiple columns at same time.

Re claim 7, it has similar limitations cited in claim 3. In addition, Horton in view of Hung et al. do not disclose the pfsb and pfadd instructions. However, the examiner takes an official notice that these instructions pfsb and pfadd are known in the art. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add the pfsb and pfadd instructions into Horton's invention for performing the DCT operations because it would enable to simplify the system software and improve the system performance

Re claims 8-10, Horton further discloses for two columns at a time, as each weighted-rotation operation is done, storing weighted-rotation operation results to the intermediate buffer; for two columns at a time, retrieving weighted-rotation operation results from the intermediate buffer; performing a second plurality of weighted-rotation operations on the retrieved values; again storing weighted-rotation operation results to the intermediate buffer as the weighted-rotation operations of the second plurality are done; again retrieving weighted-rotation operation results from the intermediate buffer; performing a third plurality of weighted-rotation operations on the retrieved values; yet again storing weighted-rotation operation results to the intermediate buffer as the weighted-rotation operations of the third plurality are done; yet again retrieving weighted-rotation operation results from the intermediate buffer; performing a fourth plurality of weighted-rotation operations on the retrieved values; converting the weighted-rotation operation results from the fourth plurality to integer results; for two

columns at a time, writing the integer results to an output buffer (all features are seen in Figures 1 and 10 for plurality of stages in second DCT and col. 4 lines 40-45).

Re claim 11, it has same limitations cited in claim 8. Thus, claim 11 is also rejected under the same rationale in the rejection of rejected claim 8.

Re claim 12, it has same limitations cited in claim 7. Thus, claim 12 is also rejected under the same rationale in the rejection of rejected claim 7.

Re claim 14, it has same limitations cited in claim 9. Thus, claim 14 is also rejected under the same rationale in the rejection of rejected claim 9.

Re claim 15, it has same limitations cited in claim 10. Thus, claim 15 is also rejected under the same rationale in the rejection of rejected claim 10.

Re claim 18, it is a computer system claim of claim 11. Thus, claim 18 is also rejected under the same rationale in the rejection of rejected claim 11.

Re claim 19, it is a carrier medium comprising software instruction claim of claim 11. Thus, claim 19 is also rejected under the same rationale in the rejection of rejected claim 11.

Re claim 20, it has same limitations cited in claim 6. Thus, claim 20 is also rejected under the same rationale in the rejection of rejected claim 6.

Response to Arguments

8. Applicant's arguments filed 03/12/2004 have been fully considered but they are not persuasive.

- a. The applicant argues in page 11 for claim 1 second paragraph that the cited reference does not teach the altering the arrangement of values in the registers three times between performances of weighted-rotation operations.

The examiner respectfully submits that the cited reference clearly discloses in Figure 1 a multiple stage ($m = 3$ in this case) FFT wherein at each stage, values in the registers are changed accordingly.

- b. The applicant argues in page 11 for claim 1 last paragraph that the cited reference does not teach the loading an entire row of data values into registers.

The examiner respectfully submits that the limitation "loading an entire row of data values into registers" is not cited in the claim. Even the claim has the limitation, the cited reference clearly discloses this limitation in Figure 1 wherein a size of row is equal to 8 (x_0-x_7).

- c. The applicant argues in page 12 for claim 6 fourth paragraph that the cited references in alone or combine do not disclose, teach, or suggest the limitations cited in the claim.

The examiner respectfully submits that the rejection clearly states above. In addition, the specification does not clearly disclose or explain the structure for processing two columns at a time differ from the prior art using multiple set of single processing column. For rejection, the examiner interprets claims with this

Art Unit: 2124

limitation "for two columns at a time" as additional set of single processing column for reducing the processing time.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (703) 305-5655. The examiner can normally be reached on M => F from 7:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaki Kakali can be reached on (703) 305-9662. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system: Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C. Do
Examiner
Art Unit 2124

May 24, 2004

Kakali Cha.

**KAKALI CHAKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100**